

by prohibiting allocating the same Physical Uplink Control Channel resource to User Equipments on different levels of the tree; and/or

by prohibiting allocating any child element on any lower level if a parent element has been allocated on any higher level.

**8.** The method according to claim **6**, wherein

different User Equipments are primarily allocated to different tree levels based on a metric,

the metric considers at least one of requests of a number of the User Equipments to be scheduled on its Secondary Cell(s), the User Equipment buffer, the User Equipment radio conditions, the load of the User Equipment's Secondary Cell(s), and

if there is no suitable element found for a User Equipment on this tree level, the next lower level is checked.

**9.** The method according to claim **6**, wherein some or all assigned User Equipments are upgraded to a higher tree level if all of the child elements including all lower levels of this higher level element are not allocated to any other User Equipment.

**10.** The method according to claim **1**, wherein the method is applicable to Physical Uplink Control Channel format 3 and Physical Uplink Control Channel format 1b with channel selection.

**11.** An apparatus including a function for managing control channel usage in Carrier Aggregation, comprising:

at least one processor, and

at least one memory for storing instructions to be executed by the processor,

wherein the at least one memory and the instructions are configured to, with the at least one processor, cause the apparatus at least to perform the method according to claim **1**.

**12.** A computer program product for a computer, comprising software code portions for performing the steps of claim **1** when said product is run on the computer.

**13.** The computer program product according to claim **12**, wherein the computer program product comprises a computer-readable medium on which said software code portions are stored, wherein the computer-readable medium is directly loadable into the internal memory of the computer and/or transmittable via a network by means of at least one of upload, download and push procedures.

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